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The Effects of Kangaroo Mother Care and Swaddling on Venipuncture Pain in Premature Neonates: A Randomized Clinical Trial

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Abstract

Background: Hospitalized premature babies often undergo various painful procedures. Kangaroo mother care (KMC) and swaddling are two pain reduction methods.
Objectives: This study was undertaken to compare the effects of swaddling and KMC on pain during venous sampling in premature neonates.
Patients and Methods: This study was performed as a randomized clinical trial on 90 premature neonates. The neonates were divided into three groups using a random allocation block. The three groups were group A (swaddling), group B (KMC), and group C (control). In all three groups, the heart rate and arterial oxygen saturation were measured and recorded in time intervals of 30 seconds before, during, and 30, 60, 90, and 120 seconds after blood sampling. The neonate's face was video recorded and assessed using the premature infant pain profile (PIPP) at time intervals of 30 seconds. The data was analyzed using the t-test, chi-square test, Repeated Measure analysis of variance (ANOVA), Kruskal-Wallis, Post-hoc, and Bonferroni test.
Results: The findings revealed that pain was reduced to a great extent in the swaddling and KMC methods compared to the control group. However, there was no significant difference between KMC and swaddling ($P \geq 0.05$).
Conclusions: The results of this study indicate that there is no meaningful difference between swaddling and KMC on physiological indexes and pain in neonates. Therefore, the swaddling method may be a good substitute for KMC.

Keywords: Infant, Premature, Neonate, Pain, Venipuncture, Kangaroo Mother Care

1. Background

According to the international association of pain study, pain is an unpleasant feeling and an emotional experience following actual or potential tissue damage (1), which is created by a harmful stimulus, and its goal is essentially to defend and protect (2). Presently, it is accepted that neurons are formed during the embryonic period and anatomically and functionally have the necessary efficiency to conduct painful stimuli (3). Premature neonates are able to identify and react automatically to pain as early as 20 weeks of age (4). In addition, premature neonates are less able to reduce or inhibit painful stimuli because of descent neuron lines, which make them more sensitive to pain (3, 5). According to the world health organization (WHO), 15 million premature neonates are born globally each year, which is more than 0.1 of total neonate births (6). Premature neonates undergo many diagnostic and therapeutic procedures in the neonatal intensive care unit (NICU), which is reported to be more than 10 to 16 interventions per day (7-9). Unfortunately, 40 to 90 percent of neonates do not receive any preventative or therapeutic actions to reduce the pain of these painful interventions (7, 8, 10). The most common intervention is blood sampling, or heel stick, to prepare laboratory samples (11). Continuous pain impulses by afferent nerves to specific areas of the brain cause atrophy of that part of the brain. The repeated pain of procedures leads to ventricular bleeding in premature neonates, increases in brain plasticity of neonates, and reduction of subcortical white and gray matter, with subsequent increases in fluctuations inside the skull (12). Therefore, controlling the pain of harmful procedures, such as blood sampling, is of great importance, especially in premature babies, as it is proposed that the neonatal pain threshold is 30 to 50 percent less than in adults (3, 5). Moreover, uncontrolled pain can increase the risk of infection, the hospitalization period, and the death rate of neonates (13). Pain relief, which is among nursing interventions, can be done with or without medicine (14). Although the use of powerful medications for neonatal